

# ENSO prediction using an earth system model incorporating a high-resolution tropical ocean nesting model

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Mesoscale eddies in the tropical oceans have significant impacts on the oceanic mean states, atmospheric circulation, ENSO characteristics, and other natural variabilities. Here, we found a significant improvement of ENSO prediction skill by incorporating a high-resolution tropical ocean nesting model into a seasonal prediction system based on an earth system model MRI-ESM1. Because of the realistic representation of tropical instability waves (TIWs), the simulated eddy heat flux improves not only tropical oceanic mean states but also spatial distributions of mean surface wind stress and precipitation in the nested version of MRI-ESM1. ENSO characteristics (amplitude, period, spatial pattern, asymmetry, teleconnection) are also modified through the changes of mean state, resulting in more accurate ENSO prediction several months ahead.

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